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Pedagogic Course in Physics

First Year

Meteorology: (a) The province of meteorology. (b) Brief sketch of the growth of the study. (c) The modern contrasted with the early study of the subject. (4) Meteorological phenomena. (e) Meteorological instruments. (f) Construction and use of meteorological instruments. (g) Meteorological observations. (h) Barometer, barograph, thermometers, thermograph, anemometer, anemograph, hygrometer, rain-gauge. (i) History and growth of the signal service. (j) How to make weather maps. (k) How to read weather maps. (l) How to forecast the weather. (m) The study applied to animal and plant life. (n) The value of the study to commerce.

Pedagogic Course in Chemistry

FIRST YEAR

The Chemistry of Decay: Laboratory work upon material gathered from the field. (a) A determination of the composition of leaves, fruits, and grasses. (b) The changes that take place in decay.

High School Course in Physics

THIRD YEAR

Sound, Heat, and Light: (a) Kinds of vibrations. (b) Media of propagation. (c) Sound waves, heat waves, and light waves. (d) Interference, reflection, and refraction of waves.

High School Course in Physics

FOURTH YEAR

Magnetism: (a) Magnets. (b) The earth's magnetism. (c) Magnetic units.

Geography

Zonia Baber

Wallace W. Atwood

Pedagogic School

The year's work will be the study of the Chicago field from the geographical and commercial aspects; also a similar consideration of the wider field of the continents of North America, South America, and Eurasia.

I. Value of Chicago and its environs as a basis of geographical study.

1. Genesis of forms of land and water.
2. Working forces: (a) Wind. (b) Waves. (c) Rain. (d) Streams. (c) Weathering agents.
3. Man's adjustment to this region: (a) Farming; gardening. (b) Quarrying; mining. (c) Cities; industries. (d) Commerce.

Which aspect appeals most directly to each grade of pupils?

II. Special study of stream work as shown in the small streams in the region of Glencoe and the Desplaines River.

1. Measure work of a stream done in a certain time: (a) Means of accomplishing the result: wearing power, carrying, and deposition.
2. Registration of stream work on the face of the earth in valleys of various shapes. (a) Relation of the shape of a valley to its erosive history.

3. Bed of stream. (a) Falls, rapids, and other incidents.

4. Effect of stream deposition at debouchure.

2. Use of rivers to man, to animals, to vegetation, to earth. Make valley forms, deltas, etc., in out-of-door laboratory.

NOTE.—Apparatus consists of small pond of water and hose of different sizes for conducting the water into streams.

III. Value of laboratory in teaching geographical subjects to pupils.

References: *Geography of Chicago and Its Environs*, Salisbury and Alden; *Physical Geography*, Davis; *Physical Geography*, Tarr.

First Year, High School

Physiography of the Land:

During the month as many field trips will be taken as is practicable, and the classroom and laboratory work will be based upon the observations made in the field.

I. Weathering, or soil-making.

1. Soils and subsoils: (a) Color. (b) Thickness. (c) Constitution. (d) Distribution.

2. Relation of loose, mantling material to underlying rock of region. (a) Did the mantle

material come from the underlying rock? (b) If so, how was it formed? If not, where did it come from? and how was it brought? (c) Residual and transported soils.

3. Agents of weathering and how each one acts. (a) Mechanical. (b) Chemical.

4. Rate of weathering.

5. Different kinds of soils and their influence on native vegetation and on agriculture.

II. Valley Development.

1. Origin and growth of gullies. (a) Why are there gullies on the surface of the earth? (b) How do they grow? In length, in depth, in width? (c) Forms of young valleys.

2. Getting a permanent stream.

3. Work of the stream. (a) Erosion. (b) Transportation. (c) Deposition.

References: *Physical Geography*, Davis; *Realm of Nature*, Mill; *Elementary Lessons in Physical Geography*, Giekie; *Physical Geography of New Jersey*, Salisbury; *Physical Geography of Devil's Lake*, Salisbury and Atwood.

Second Year, High School

Meteorology: I. Observational work in field and laboratory as to

(a) Changes in temperature of the air. (b) Changes in pressure of the air. (c) Constitution of the air. (d) Nature and use of each constituent. (e) Clouds. (f) Winds. (g) Storms.

II. Amount and distribution of the atmosphere.

III. Warming and cooling of the atmosphere.

IV. Changes in pressure. (a) In the great wind and calm belts. (b) In the storm centers.

References: *Elementary Meteorology*, Davis; *Meteorology*, Waldo. Weather Maps.

Third Year, High School

Historical Geology: I. Study of Stony Island and quarries about the city:

1. Kind of rock formation seen. (a) Its material. (b) Its structure.

2. Develop the idea of the formation of the limestone.

3. Develop the idea of changes in elevation of the land surfaces.

II. What other formations may have been made similarly to the limestone at Stony Island? (Sedimentary rocks.)

III. What were the sources of material for the first sedimentary formations? (Igneous rocks.)

IV. The processes which have always been at work bringing about geologic changes:

1. Destructive processes: (a) Associated with the atmosphere. (b) Running water. (c) Ice work. (d) Wave work.

2. Reconstructive processes. (a) Associated with swamp and river deposits. (b) Lake and ice deposits. (c) Marine and estuarine deposits. (d) Volcanic.

References: *Introduction to Geology*, Scott; *Text-Book on Geology*, Geikie.

Fourth Year, High School

Anthropogeography: The intimate relation of man to his geographical environment is a consideration of greatest importance in the development of the race. Man's ability to extend his environment by rapid communication until the world has become almost his immediate neighborhood characterizes the present civilization. An intimate and generous appreciation of all the peoples of the world is a basis for the realization of the brotherhood of man. The work in anthropogeography will be a general consideration of all the nations and peoples of the world, together with their geographical association.

I. Man's relations to his surroundings.

In what manner has man responded to the geographical environment in this region? How has he changed conditions to minister to his needs? What aspects seem most stubborn in responding to man's control?

II. Building of Chicago.

What elements have contributed to the building of this city? Of what nationalities is it composed? Account for the presence of the different peoples. Influence of the father country upon the character and habits of the adopted people. Visit regions occupied by special nationalities, as Italians, Greeks, Norwegians, Chinese, etc.

III. Industries of this region.

Why do certain industries obtain in this region?

IV. General forms of land and water, topography, and vegetation on the character and development of people.

1. Influence of continents, islands, seas, lakes, rivers, mountains, and plains on associated peoples. Give examples of each.

2. Special study of the great river valleys

which have aided in developing primitive historical people. (a) Nile, Tigro-Euphrates, Indus, Hoangho. What conditions in each specially favored the growth of its respective people? What great geological changes have occurred? Are conditions favorable to primitive development equally potential in advanced civilization?

References: *Man and His Work*, Herbertson; *Earth and Its Inhabitants*, Reclus; *Compendiums*, Stanford.

Mathematics in the High and Pedagogic Schools

George W. Myers

More than a dozen years' class-room experience with mathematical students convinces the writer that the most serious criticism against current methods of teaching elementary mathematics is their utter failure to develop the mathematical sense, to give the student a degree of power to recognize the quantitative aspects of his environment in any way commensurate with the time and thought put upon these subjects. Teachers everywhere, recognizing that serious defects exist in current mathematical pedagogy, seem to be focusing their attention almost entirely upon the attempt to make the meaning of the mathematical processes clearer. In the writer's opinion this is not the main, or even a very serious difficulty. Nor does it appear to him that the lack of analytic power is so serious a matter as some would make it out. The crying need of the mathematical student of our time is the ability to recognize the place and necessity for the use of the numbering function in grappling with his environment. A very limited range of mathematical knowledge, with the power to use it practically, is worth far more to both the student and the world than an unlimited facility in the manipulation of processes without the ability to apply his skill to the concrete world. The ideal

mathematician is he who, possessing enough mechanical skill to perform the arithmetical operations with ease, and enough analytic power to enable him to pass readily from the whole to its related parts, perceives with equal ease the abstract in the concrete, and the concrete in the abstract.

Algebra in the High School

1. Numbers represented by letters.

The representation of generalized number by letters should be taught before the high school. If this has not been done, use the relations between the sides and perimeters, areas, etc., of squares, oblongs, right, equilateral, and isosceles triangles. Draw these figures, cut off their angles, apply them to each other and note whether or not the angles are equal. Designate the angles by letters and represent their sums and differences symbolically.

Illustrative examples:

If a certain line be called x , what shall we call twice that line? Five times the line? a times the line? z times the line?

If a man is three times as old as his son and the son is b years old, how old is the man?

2. The use of the symbols $+$, $-$, $\times$ and $\div$ in algebra.

a. They have the same uses as in arithmetic.

b. Their extended uses in algebra.

c. Other ways of representing $\times$ and $\div$.